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LANDSAT-D PROJECT

ADDS/LAS

SCROUNGE

INTERFACE CONTROL DOCUMENT

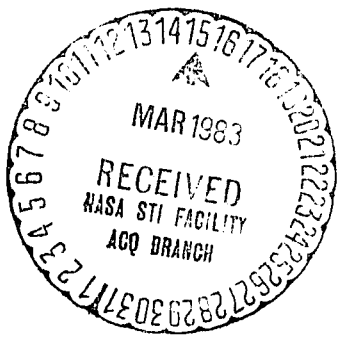
Date: February 8, 1982

Approval:

Dr. A. Krueger, ADDS Manager

2/8/82

J. C. Lyon, LAS Manager



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1.0 Scope

This Interface Control Document specifies the content and format of all data to be exchanged between the Applications Developmental Data System (ADDS) and the Landsat-D Assessment System (LAS) for satisfaction of "Scrounge" product generation requirements. Additional (non-scrounge) interface requirements are to be specified in a separate document governing ADDS/LAS use for data investigations.

1.1 Introduction

The Landsat-D Project is obligated to provide early access to Thematic Mapper (TM) data on a one scene per day basis (scrounge) until the Mission Contractor (GE) is able to process TM data on a routine basis approximately one year after the launch of the D space-craft. The NASA/GSFC Applied Engineering Division is developing the Applications Developmental Data System (ADDS) which will provide partially processed TM data tapes on CCT's. The Landsat-D Assessment System (LAS) will process the TM data to fully processed data tapes on 6250 bpi computer compatible tapes and provide required film data products.

1.2 Purpose

The ADDS generates all partially processed TM data for subsequent processing by the LAS. This specification establishes the format and content of the partially processed data, and of all other data to be exchanged between the two systems for scrounge operations.

1.3 Applicability

This document applies to all Landsat-D data exchanges between the ADDS and the LAS required for scrounge product generation.

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2.0 Related Documents

a. GES 10033

Landsat-D Data Format Control Book; Volume VI; Appendix A; Partially Processed Thematic Mapper; High Density Tape (HDT-AT), dated 7/31/81.

b. GE PIR IT80-LSD-MMF-124

"Accelerated Payload Correction Subsystem Output CCT Format" by D. Abbot.

3.0 Operational Interface Requirements

Data will be collected by the spacecraft at the World Reference Scenes from which it is possible to receive direct telemetry at the Transportable Ground Station (TGS) located at GSFC. This amounts to approximately 30 scenes per day. The LAS is capable of processing only one TM scene per day. Therefore, a selection from available scenes must be made by the Project and transmitted to the ADDS/LAS.

3.1 Requests for Partially Processed TM Data

The LAS Science/Requirements Manager will request the processing of specific scenes by the ADDS. The request will be made to the Project Science Office where it will be evaluated in conjunction with other user requests and prioritized. The validated request will be appended to the APCS tape and will specify all ADDS and LAS processing requirements. The Science Office will coordinate the scheduling of processing requests through the Landsat Project Office Mission Operations Manager, to provide maximum program benefit from a severely restricted resource.

3.2 Partially Processed TM Data

The primary data input to the LAS is partially processed TM data which will be output by the ADDS on standard 6250 bpi CCT's (designated CCT-BT).

The RLUT generation options with histograms are not available on the ADDS and only the calibration lamp data will be used to generate gains and offsets by the ADDS and entered into the support data. Thus RLUT's will not have been applied to the data.

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4.0 Interface Media

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4.1 Computer Compatible Tapes

Computer compatable tapes (CCT's) are the prime medium for transmission of image data. Standard VAX 6250 bpi 9 track tapes are the specified CCT's.

4.2 Written Communication

Written communication is by standard internal (NASA/GSFC) memoranda for scene data requests, algorithm specification and other required written communication. No special forms or formats are required.

5.0 Data Formats

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5.1 CCT-BT

The mode for transmitting partially processed TM data will be computer compatible tape (CCT). One TM scene and its associated HAAT data will require two 6250 bpi CCT's, designated jointly as the "CCT-BT" product.

5.2 CCT-BT Tape Structure

The basic content and structure of each volume of the CCT-BT is shown in figure 5.2. The file and record structure will not be consistent with the VAX/VMS FILES-11 structure. Each volume of the CCT-BT will have the following characteristics:

Label Structure:	Nonlabeled
File Organization:	Sequential
Record Structure:	Fixed Length
Logical Record Length:	6400 bytes
Physical Record Length:	32000 bytes

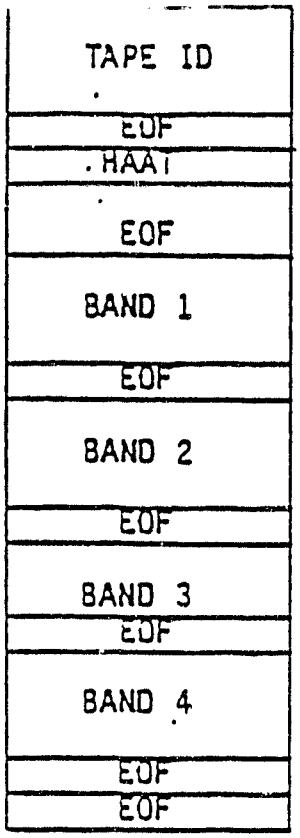
Each physical record will be constructed by internally blocking five logical records into one 32000 byte record and writing the physical record to the CCT using VAX/VMS QIO system calls.

Each logical record will be constructed under the following conventions:

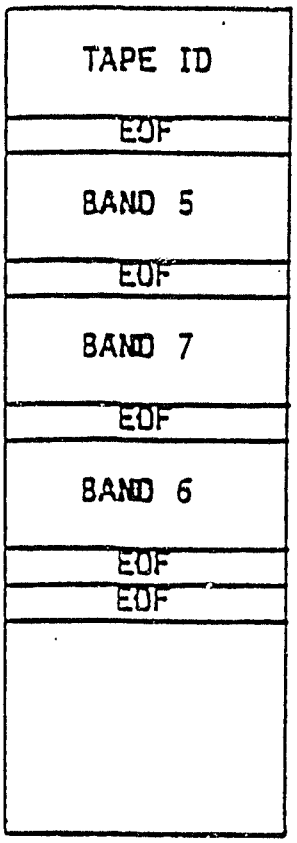
a. All indices are VAX indices.

b. The bit numbering for discrete bit fields within the HAAT data follow the convention defined in the GES 10033 Landsat-D Data Format Control Book, Volume IV, Appendix A, Partially Processed Thematic Mapper High Density Tape (HDT-AT) (Ref. a).

c. The integer and floating point representations are the VAX internal representation.



CCT-8T VOL I



CCT-8T VOL 2

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FIGURE 5-2

STRUCTURE OF CCT-8T VOLUME SET

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5.2.1 Tape Identification File

The first file of each volume of the CCT-BT will be the tape identification file. This file will be one physical record in length. The first logical record will contain:

a. Date the tape was created

b. Software version number used to create the tape

c. WRS row and path identifying the scene recorded on the tape

d. Acquisition date of the scene

e. Volume number of the volume set

The format of the tape identification record is defined in figure 5-2.1. The remaining four logical records are zero fill.

	S T	L = Landsat N = ASCII Mission Number 4 = LS-D 5 = LS-D'
	T Y	
	Y D	S = ASCII sensor type T = TM
	D D	TT = ASCII tape type CC = computer compatible
	X X	YY = Last two digits of year in ASCII DDD = Day of year in ASCII XX = ASCII tape sequence number. Incremented for each scene generated during the day 01 - 99
13-14	Ø Ø	
15-22	C C T - Ø T Ø V	ASCII CCT-8T volume indicator V = ASCII volume of CCT-8T set (1 or 2)
23-24	Ø Ø	
25-38	D D D D Ø Ø P P P - R R R Ø	ASCII Scene Identification DDDD = day number, relative to launch, at time of observation PPP = WRS path number RRR = WRS row number

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FIGURE 5-2.1

TAPE IDENTIFICATION RECORD
(SHEET 1 OF 2)

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41-52	A D D S Ø Ø X X X • Y Y	ASCII software version number

53-6400 BLANK FILL

FIGURE 5-2.1

TAPE IDENTIFICATION RECORD
(SHEET 2 OF 2)

32 BITS	16 BITS	16 BITS	(794 BYTES)
SYNC PATTERN	MINOR FRAME COUNT	MINOR FRAME TYPE CODE	DATA FIELD BYTES 1 - 794
SYNC PATTERN	MINOR FRAME COUNT	MINOR FRAME TYPE CODE	DATA FIELD BYTES 795 - 1588
SYNC PATTERN	MINOR FRAME COUNT	MINOR FRAME TYPE CODE	DATA FIELD BYTES 1589 - 2382
SYNC PATTERN	MINOR FRAME COUNT	MINOR FRAME TYPE CODE	DATA FIELD BYTES 2383 - 3176
SYNC PATTERN	MINOR FRAME COUNT	MINOR FRAME TYPE CODE	DATA FIELD BYTES 3177 - 3970
SYNC PATTERN	MINOR FRAME COUNT	MINOR FRAME TYPE CODE	DATA FIELD BYTES 3971 - 4764
SYNC PATTERN	MINOR FRAME COUNT	MINOR FRAME TYPE CODE	DATA FIELD BYTES 4765 - 5558
SYNC PATTERN	MINOR FRAME COUNT	MINOR FRAME TYPE CODE	DATA FIELD BYTES 5559 - 6352

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FIGURE 5-2.3

GENERAL HDT-AT MAJOR FRAME FORMAT

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5.2.2 HAAT Data File

The HAAT data file will be the second file written to the first volume of the CCT-BT. The HAAT data will be in the same sequence as on the HDT-AT except that replicated HDT-AT major frames and preamble/filler will be omitted.

The HAAT data file will be seven physical blocks in length. The first 32 logical records will be the HAAT data. The remaining logical records will be zero fill.

The format and content of the data field of each logical record for a given minor frame code are identical to the format and content of the corresponding HDT-AT major frame as defined in the GES 10033 Landsat-D Data Format Control Book Volume VI, Appendix A, Partially Processed Thematic Mapper High Density Tape (HDT-AT) (Ref. a).

The general format of an HDT-AT major frame is shown in figure 5-2.3. The pertinent fields of the major frame are (1) 32-bit sync pattern, (2) 8-bit minor frame counter, (3) 8-bit minor frame type code and (4) 6352 bytes of data.

The generalized format of a logical record for the CCT-BT HAAT data is shown in figure 5-2.4. The pertinent fields of the record are (1) 8-bit minor frame type code (2) 6352 bytes of data and (3) 44 bytes of fill.

5.2.3 Non-Band 6 TM Video Data Files

Non-band 6 TM video data will be in band-sequential (BSQ) format. Data for each band will be in individual files positioned as indicated in figure 5-2.

Each data file will contain 374 scans of TM video and support data relating to the WRS scene specified in the Tape Identification File. The scans will be those scans associated with the systematic correction data (SCD) APCS output data for the given scene.

The order of the logical records is defined in table 5-2.1.

The structure of each logical record is shown in figure 5-2.5. The pertinent fields of the record are (1) minor frame type code, (2) scan line identification (SLID), (3) video data, and (4) support data. The minor frame type code, SLID and support data are as defined in the GES 10033 Landsat-D Data Format Control Book (Preliminary) Volume VI, Appendix A, Partially Processed Thematic Mapper High Density Tape (HDT-AT). (Ref. a) The video data alignment within each logical record will be as specified in the above document, but the video data will not be radiometrically corrected. No detector patching will be performed.

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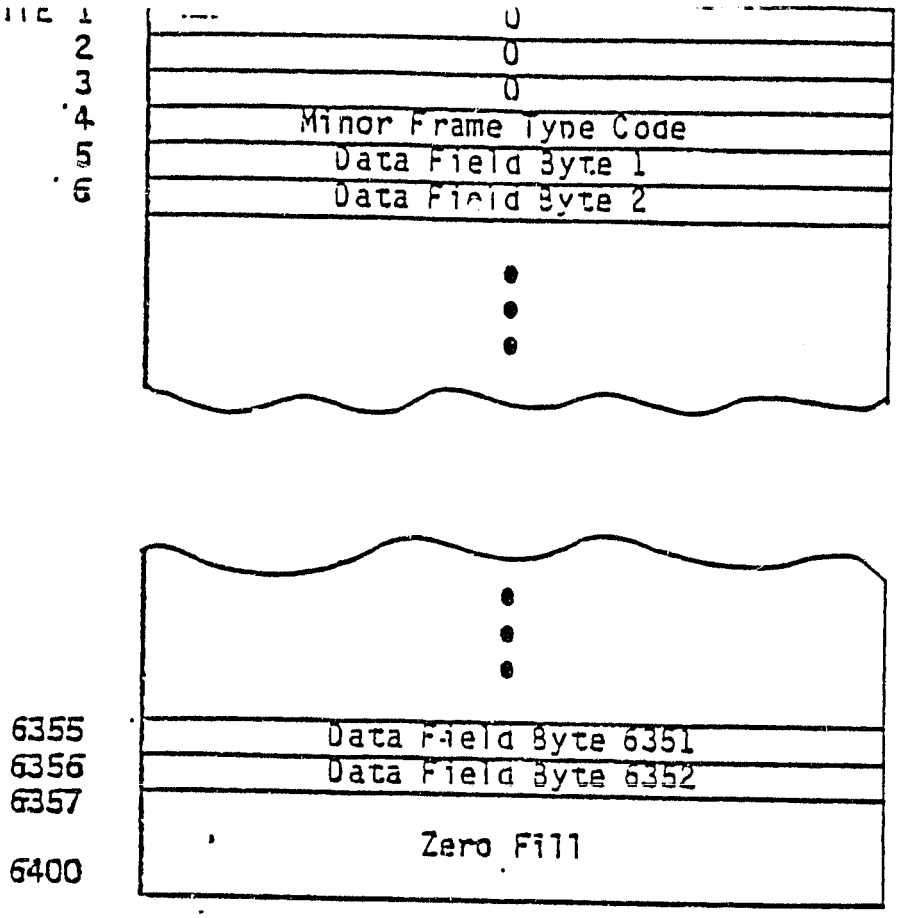

FIGURE 5-2.4

GENERALIZED FORMAT OF CCT-BT HAAT LOGICAL RECORD

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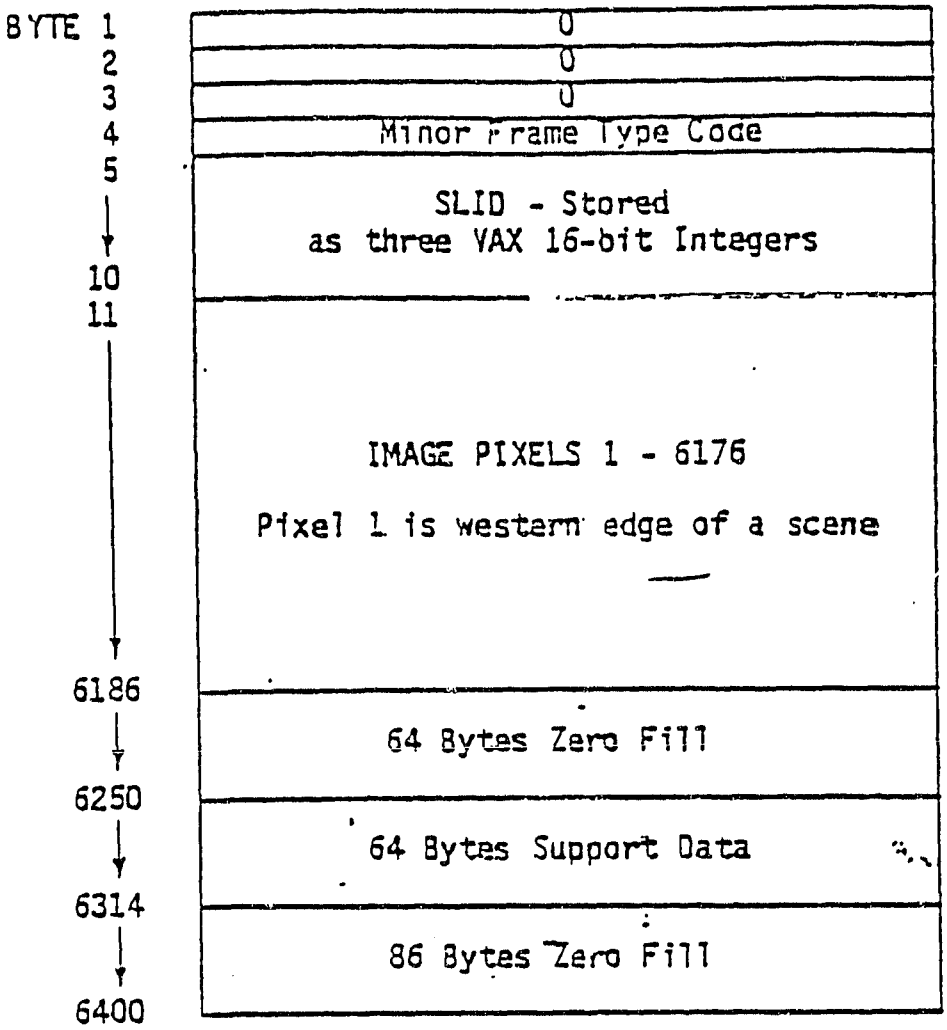

FIGURE 5-2.5

TM VIDEO LOGICAL RECORD

Record Number	Detector Number	Scan Number
1	16	1
2	15	1
.	.	.
.	.	.
.	.	.
16	1	1
17	16	2
.	.	.
.	.	.
.	.	.
32	1	2
.	.	.
.	.	.
.	.	.
5984	1	374

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TABLE 5-2.1

NON-BAND 6 LOGICAL RECORD ORDERING

Note that the SLID's interval number and mirror scan counter are relative to the scene's position within the portion of the video telemetry interval read by the system during the data extraction. In general, the SLID mirror scan counter of the first line of the scan will not be one, but will be the same as that specified in the scene start SLID of the HAAT scene header data.

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5.2.4 Band 6 TM Video Data File

Band 6 TM video data will be in BSQ format. The data for band 6 will be the fourth file on the second volume.

The data file will contain 374 scans of TM band 6 video and supporting data relating to the WRS scene specified in the Tape Identification File. The scans will be those scans associated with the SCD APCS data. The order of the logical records is defined in table 5-2.2.

The structure of each logical record is shown in figure 5-2.5. The video data will be replicated horizontally only and aligned as specified in the GES 10033. The data will not be radiometrically corrected. No detector patching will be performed. The SLID mirror scan counter of the first line of the scene will be the same as that specified in the scene start SLID of the HAAT scene header data.

Record Number	Detector Number	Scan Number
1	4	1
2	3	1
3	2	1
4	1	1
5	4	2
6	3	2
.	.	.
.	.	.
.	.	.
1496	1	374

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TABLE 5-2.2

BAND 6 LOGICAL RECORD ORDERING